

WHAT IS CLAIMED IS:

1. A communication relay device connected to a home network, for relaying information between an outside  
5 communication device connected to an outside network and a home communication device connected to the home network, comprising:

a first copyright protection unit configured to carry out a first authentication and key exchange  
10 processing for purpose of copyright protection between the communication relay device and the home communication device on the home network;

a second copyright protection unit configured to carry out a second authentication and key exchange  
15 processing for purpose of copyright protection between the communication relay device and the outside communication device on the outside network, based on a scheme different from the first authentication and key exchange processing;

20 an identification information memory unit which stores an identification information of the outside communication device; and

a bridge processing unit configured to receive an access request for the home network from the outside  
25 communication device, and carry out transmission/reception of information between the home

network and the outside network only when the outside communication device which made the access request is stored in the identification information memory unit and then only when both the first authentication and  
5 key exchange processing by the first copyright protection unit and the second authentication and key exchange processing by the second copyright protection unit succeed.

10 2. The communication relay device of claim 1, further comprising a registration control unit configured to limit a number of outside communications devices that can be stored in the identification information memory unit to a prescribed number,

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3. The communication relay device of claim 1, further comprising a registration control unit configured to prohibit a deletion of a stored identification information in the identification information memory  
20 unit.

4. The communication relay device of claim 1, wherein the identification information memory unit stores in advance at least one of a device ID for identifying the  
25 outside communication device and a physical address of a communication interface for purpose of copyright

protection, before transmitting contents to the outside communication device.

5. The communication relay device of claim 1, wherein  
5 the identification information memory unit has a mode for storing a result of the second authentication and key exchange processing by the second copyright protection unit, in a state where an access to the home network is permitted to the outside communication  
10 device.

6. The communication relay device of claim 5, further comprising:

a user information memory unit which stores a user  
15 authentication information for the outside communication device; and

an authentication judgement unit configured to judge whether the user authentication information of the outside communication device which made the access  
20 request for the home network is stored in the user information memory unit or not;

wherein the bridge processing unit judges whether or not to permit an access between the home network and the outside network, according to a judgement result of  
25 the authentication judgement unit.

7. The communication relay device of claim 5, further comprising:

a user information memory unit which stores a user authentication information for the outside

5 communication device; and

an authentication judgement unit configured to judge whether the user authentication information of the outside communication device which made the access request for the home network is stored in the user

10 information memory unit or not;

wherein the identification information memory unit stores at least one of a device ID for identifying the outside communication device and a physical address of a communication interface for purpose of copyright  
15 protection, according to a judgement result of the authentication judgement unit.

8. The communication relay device of claim 1, wherein the identification information memory unit has a mode  
20 for storing a result of the first authentication and key exchange processing by the first copyright protection unit.

9. The communication relay device of claim 8, further  
25 comprising:

a user information memory unit which stores a user

authentication information for the outside  
communication device; and

an authentication judgement unit configured to  
judge whether the user authentication information of  
5 the outside communication device which made the access  
request for the home network is stored in the user  
information memory unit or not;

wherein the bridge processing unit judges whether  
or not to permit an access between the home network and  
10 the outside network, according to a judgement result of  
the authentication judgement unit.

10. The communication relay device of claim 8, further  
comprising:

15 a user information memory unit which stores a user  
authentication information for the outside  
communication device; and

an authentication judgement unit configured to  
judge whether the user authentication information of  
20 the outside communication device which made the access  
request for the home network is stored in the user  
information memory unit or not;

wherein the identification information memory unit  
stores at least one of a device ID for identifying the  
25 outside communication device and a physical address of  
a communication interface for purpose of copyright

protection, according to a judgement result of the authentication judgement unit.

11. The communication relay device of claim 1, further  
5 comprising:

a Web page production unit configured to produce a Web page describing information for controlling or monitoring the home communication device; and

a Web page disclosing unit configured to transmit  
10 the Web page produced by the Web page production unit to the outside network;

wherein the outside communication device controls or monitors the home communication device by using the Web page received through the outside network.

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12. The communication relay device of claim 1, wherein the first copyright protection unit realizes copyright protection by adopting at least one of a provision for limiting a TTL (Time To Live) field of a packet  
20 transmitted/received between the home communication device and the outside communication device to a specific value, a provision for using a link local address in an Internet protocol, and a provision for using a Ethernet frame as a transmission packet.

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13. The communication relay device of claim 1, further

comprising a routing control unit configured to notify  
a specific port number to a connection device for  
carrying out a connection control for the home network  
and the outside network, and make a setting such that a  
5 packet transmitted to the specific port number will be  
transmitted to the communication relay device.

14. The communication relay device of claim 1, further  
comprising a routing control unit configured to notify  
10 a global IP address of the communication relay device  
to a connection device for carrying out a connection  
control for the home network and the outside network,  
and make a setting such that a packet destined to the  
global IP address will be transmitted to the  
15 communication relay device.

15. The communication relay device of claim 1, wherein  
the bridge processing unit also carries out at least  
one of a coding conversion, a protocol conversion and a  
20 bandwidth conversion for data entered from one of the  
outside network and the home network, and then  
transmits converted data to another one of the outside  
network and the home network.

25 16. A communication system, comprising:  
a home communication device on a home network;

an outside communication device on an outside  
network; and

a communication relay device for relaying  
information between the home network and the outside  
5 network, the communication relay device having:

a first copyright protection unit configured to  
carry out a first authentication and key exchange  
processing for purpose of copyright protection between  
the communication relay device and the home  
10 communication device on the home network;

a second copyright protection unit configured  
to carry out a second authentication and key exchange  
processing for purpose of copyright protection between  
the communication relay device and the outside  
15 communication device on the outside network, based on a  
scheme different from the first authentication and key  
exchange processing;

an identification information memory unit which  
stores an identification information of the outside  
20 communication device; and

a bridge processing unit configured to receive  
an access request for the home network from the outside  
communication device, and carry out  
transmission/reception of information between the home  
25 network and the outside network only when the outside  
communication device which made the access request is



stored in the identification information memory unit  
and then only when both the first authentication and  
key exchange processing by the first copyright  
protection unit and the second authentication and key  
5 exchange processing by the second copyright protection  
unit succeed.

17. A computer program product for causing a computer  
to function as a communication relay device connected  
10 to a home network, for relaying information between an  
outside communication device connected to an outside  
network and a home communication device connected to  
the home network, the computer program product  
comprising:

15 a first computer program code for causing the  
computer to carry out a first authentication and key  
exchange processing for purpose of copyright protection  
between the communication relay device and the home  
communication device on the home network;

20 a second computer program code for causing the  
computer to carry out a second authentication and key  
exchange processing for purpose of copyright protection  
between the communication relay device and the outside  
communication device on the outside network, based on a  
25 scheme different from the first authentication and key  
exchange processing;

a third computer program code for causing the computer to store an identification information of the outside communication device; and

a fourth computer program code for causing the  
5 computer to receive an access request for the home network from the outside communication device, and carry out transmission/reception of information between the home network and the outside network only when the outside communication device which made the access  
10 request is stored in the identification information memory unit and then only when both the first authentication and key exchange processing by the first computer program code and the second authentication and key exchange processing by the second computer program  
15 code succeed.

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